Causes of maternal mortality in rural Bangladesh, 1976–85*

V. FAUVEAU,[1] M. A. KOENIG,[2] J. CHAKRABORTY,[3] & A. I. CHOWDHURY[4]

Of a total of 1037 women of reproductive age who died during the period 1976–85 in the Matlab area that was under demographic surveillance, 387 (37%) were maternal deaths. The mean maternal mortality over the 10-year period was 5.5 per 1000 live births (101 per 100 000 women of reproductive age). Major causes of maternal death, which were assessed using a combination of record review and field interviews, included postpartum haemorrhage (20%), complications of abortion (18%), eclampsia (12%), violence and injuries (9%), concomitant medical causes (9%), postpartum sepsis (7%), and obstructed labour (6.5%). Deaths caused by postpartum haemorrhage were positively associated with both maternal age and parity, whereas those caused by eclampsia and injuries were more common among young and low-parity women. If maternal deaths arising from complications of abortion are disregarded, 20% of all maternal deaths occurred during pregnancy, 44% during labour and the two days following delivery, and 36% during the remaining postpartum period.

These findings support the need to develop a service strategy to address the risks of childbearing and childbirth in areas such as rural Bangladesh, where almost all deliveries take place at home. This strategy must be based not only on preventive and educational interventions, including family planning and antenatal care, but also on systematic attendance at home deliveries by trained professional midwives, backed up by an effective chain of referral.

Although over the last 10 years considerable progress has been made in formulating and implementing strategies for child survival, maternal health has been relatively neglected by the health programmes of many developing countries. Indeed, globally an estimated 0.5 million women die every year of maternity-related complications, while at least 5 million suffer from non-fatal complications (*1*). Concern has also been expressed about the limited impact of maternal and child health (MCH) programmes on maternal mortality (*2*). The first study that did examine the causes of maternal death in Bangladesh was carried out in 1968 by Chen et al., who reviewed 41 maternal deaths (*3*); the small

sample size, nevertheless, precluded a detailed analysis of the relative frequency of selected causes of death. Rochat et al. provided the first countrywide estimate of causes of maternal death in Bangladesh, based on health centre reports, and discussed also possible interventions (*4*). Subsequently, Lindpainter et al. reviewed 39 maternal deaths in the Matlab area of the country during 1982.[a] Both Rochat et al. and Lindpainter et al. identified abortion as the leading cause of maternal death, being responsible for one-quarter of all such deaths. Based on separate studies of maternal mortality in rural Bangladesh conducted in 1982–83, Khan et al. and Alauddin reported maternal mortality levels of 6.2 and 5.6 per 1000 live births, respectively (*5*, *6*).

Recently, Koenig et al. examined levels and trends of maternal mortality in the Matlab area during 1976–85 (*7*). A total of 387 maternal deaths were identified, resulting in a mean maternal mortality ratio of 5.5 per 1000 live births. Over this period a reduction in the annual mortality occurred only for 1985. Maternal mortality ratios varied according to geographical area, the level in the area served by a comprehensive maternal and child health–family planning (MCH-FP) programme (5.2 per 1000) being

4923

slightly lower than that in the neighbouring reference area (5.8 per 1000), which was served only by the basic national health programme.

Here, we present a more detailed analysis of the 387 maternal deaths reported by Koenig et al., focusing on specific causes of death. The particular characteristics of this study permitted the investigation of a large sample of maternal deaths in a rural community, rather than that of the more commonly reported hospital-based data. Such a detailed assessment of causes of maternal death is essential for monitoring and evaluating ongoing health programmes as well as for designing further interventions.

MATERIALS AND METHODS

In this study, maternal death is defined as the death of a woman while pregnant or within 90 days of the termination of pregnancy, irrespective of the duration of pregnancy and the method by which it was terminated (8). This definition was chosen to ensure consistency with the parallel study on levels of and trends in maternal mortality (7); however, the WHO-recommended definition—death of a woman within 42 days of termination of pregnancy, but excluding incidental or accidental death (9)—was also employed to facilitate comparison with other studies. Maternal mortality is expressed here as either a rate per 100 000 women aged 15–44 years, which depends both on the number of pregnancies and the mortality risks associated with these pregnancies and births, or as a ratio per 1000 live births, which depends solely on the mortality risks associated with pregnancy and childbirth.

Since 1963, the Cholera Research Laboratory and its successor, the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), have carried out field studies in Matlab, a rural riverine sub-district 45 km south-east of Dhaka. Originally these studies were concerned with the epidemiology of diarrhoeal diseases and the evaluation of cholera vaccines. As a central component of this research, a demographic surveillance system has been in operation since 1966 to register vital events in a population of approximately 190 000, with periodic censuses and longitudinal recording. In October 1977, a service delivery programme was established by the ICDDR,B in one half of the Matlab study area, designated the maternal and child health and family planning (MCH-FP) area, to test the hypothesis that a carefully implemented family planning programme, associated with a few basic maternal and child health services, could significantly reduce fertility and improve child survival (10, 11). The remaining part of the Matlab study area was designated a comparison area, and continued to receive only services provided through the regular government service programme, in addition to the treatment of diarrhoeal diseases provided by the ICDDR,B.

In each village, one locally resident female community health worker (CHW) visits every household once every 2 weeks to record any vital event (birth, death, marriage, or migration) that has occurred among permanent residents since her previous visit. Also, once a month, a male health assistant accompanies the CHW on her visits to each household and conducts home interviews to complete birth and death registration forms containing details of demographic characteristics and a description of conditions and features accompanying these events.

From 1976 to 1985, 285 deaths that were related to childbearing or birth were identified by the demographic surveillance system, but this was clearly an underestimate, given the frequent difficulties in ascertaining pregnancy. In order to obtain a detailed description of the conditions, events, and symptoms that preceded death, a questionnaire was designed and applied to all deaths of women of reproductive age. In the MCH–FP area, interviews were conducted with the resident CHWs who had been in close contact with the deceased and their families throughout the programme, while additional information was obtained from the service record of the deceased, including data on their menstrual cycles. This led to identification of 40 additional maternal deaths. In cases where the CHW did not recall the death or was not familiar with the dead woman, the family of the deceased was interviewed by a trained female health worker, after obtaining their informed consent. Two additional maternal deaths were identified through this approach. In the comparison area, where because of their exclusive involvement with collecting demographic data the CHWs were less familiar with the health status of the women in the community, the health worker interviewed the female relatives of all the deceased women. An additional 60 maternal deaths were identified through this procedure.

The birth and death registration forms together with the completed questionnaires were then reviewed by an MCH-FP physician. If a maternal death was confirmed, its most likely cause was recorded, based on the history available. Multiple causes were frequently involved in maternal death, but only the primary cause, i.e., the cause suggested by the clinical description, was used. The only exceptions were abortion-related deaths, for which the underlying cause was considered. The coding system used was based on that described in the International Classification of Diseases (9), but in order to simplify the presentation, some categories were grouped together. Causes of death were termed either "direct

obstetric'' or ''concomitant'', the latter covering all fatal conditions not directly related to obstetric events (e.g., diarrhoeal diseases, respiratory infections, and jaundice) whose occurrence may have been independent of pregnancy or postpartum, but whose severity and outcome might have been aggravated by childbearing or postpartum. Concomitant causes include suicide and violent death, which are clearly not obstetric in nature, but which appear to be more frequent in the study area during pregnancy.[b]

RESULTS

Of a total of 384 397 woman-years of exposure, i.e., women aged 15–44 years during each of the ten years of the study, 1037 deaths were recorded in the study area. Of these deaths, 387 (37%) were maternal deaths, yielding a maternal mortality rate of 101 per 100 000 women aged 15–44 years; 8% of these maternal deaths involved women who were not married at the time of their death.

[b] FAUVEAU, V. *Deaths from injuries among rural Bangladeshi women.* Unpublished report, 1987.

Cause of death

Table 1 shows the major causes of maternal death in the two study areas, expressed as both cause-specific mortality rates (CSMRs) and proportionate mortality rates (PMRs). A little over three-quarters of all maternal deaths were directly related to obstetric complications. For all causes of maternal death except abortion, lower CSMRs were observed in the MCH-FP area than in the comparison area, and this resulted in a 27%-lower maternal mortality rate in the MCH-FP area ($P < 0.01$).

In order of decreasing frequency, the most common causes of direct obstetric maternal deaths in the study areas combined were as shown below.

—*Postpartum haemorrhage* (20%): however, it was not possible to identify the specific underlying conditions, such as retained placenta, cervical tear, ruptured uterus, or coagulation defects.

—*Abortion* (18%): spontaneous abortion represented less than 3% of all maternal deaths, while induced abortion accounted for 15%. Signs of sepsis accompanied 85% of all abortions, while primarily haemorrhage was associated with the remainder. Unmarried

Table 1. Distribution of causes of maternal deaths in the comparison and maternal and child health–family planning (MCH–FP) areas, Matlab, Bangladesh, 1976–85

Cause of death	Comparison area		MCH-FP area		Whole area		
	CSMR[a]	n	CSMR	n	CSMR	n	PMR[b]
Direct obstetric:							
Postpartum haemorrhage	22.5	42	17.2	34	19.8	76	19.6
Abortion	18.2	34	18.2	36	18.2	70	18.0
Toxaemia/eclampsia	13.9	26	10.1	20	12.0	46	11.9
Postpartum sepsis	9.6	18	4.0	8	6.8	26	6.7
Obstructed labour	7.0	13	6.1	12	6.5	25	6.5
Other obstetric	16.1	30	12.2	24	14.0	54	13.9
Subtotal	**87.3**	**163**	**67.8**	**134**	**77.3**	**297**	**76.7**
Concomitant:							
Injuries, violence	10.7	20	7.6	15	9.1	35	9.0
Medical causes	12.8	24	5.6	11	9.1	35	9.0
Subtotal	**23.6**	**44**	**13.2**	**26**	**18.2**	**70**	**18.0**
Unspecified	6.5	12	4.0	8	5.2	20	5.2
Total	117.3	219	85.0	168	100.7	387	100.0
Woman-years of observation	186 714		197 683		384 397		

[a] CSMR = Cause-specific mortality rate (per 100 000 women aged 15–44 years).
[b] PMR = Proportionate mortality rate (percentage).

women accounted for 36% of all complications of induced abortion.

— *Complications of toxaemia and eclampsia* (12%): seizures were observed mostly during labour or during the last trimester of pregnancy, or in the first three days postpartum.

— *Postpartum sepsis* (7%): apart from septic abortion, most deaths in this category were due to unhygienic practices during delivery. There were four deaths caused by postpartum tetanus in the comparison area, while in the MCH-FP area, where a tetanus toxoid immunization programme has been in operation since 1978 and achieved high coverage rates, there was only one case.

— *Obstructed labour* (6%) comprised complications of malpresentation, cephalopelvic disproportion, and inability to expel the fetus.

The other obstetric complications (14%) included antepartum haemorrhage, antepartum infection, severe anaemia, as well as ruptured uterus, cardiovascular complications, and other ill-defined conditions.

Concomitant causes represented 18% of all maternal deaths and were distributed as follows:

— *Injuries, violent deaths* (9%): one-third of such deaths were suicides, 25% homicides, and the rest unintentional injuries, e.g., domestic and traffic accidents, drowning, and snakebites. These deaths would not have been accounted for had the WHO-recommended definition of maternal death (excluding incidental or accidental causes) been used.

— *Concomitant medical causes* (9%): three-quarters of such deaths involved diseases of the digestive tract, e.g., diarrhoeas, jaundice, and peptic ulcer, while the remainder were mainly respiratory diseases.

Demographic correlates

Table 2 shows the percentage distribution of causes of maternal death by age and by parity for the study areas together, with the corresponding maternal mortality ratios. The relative importance of fatal postpartum haemorrhage increased with age (15% for women aged 15–19 years, 20% for those aged 20–34 years, and 24% for those aged 35–44 years). In contrast, the proportion of deaths caused by eclampsia decreased with age (18% for women aged 15–19 years, 13% for those aged 20–34 years, and 1% for those aged 35–44 years). The same trend was

Table 2. Percentage distribution of maternal deaths (and corresponding maternal mortality ratios), by cause of death, age, and parity, Matlab, Bangladesh, 1976–85

Cause of death	Maternal age			Prior parity		
	15–19 years	20–34 years	35–44 years	0	1–5	≥6
Direct obstetric:						
Postpartum haemorrhage	14.9 (1.1)[a]	20.1 (0.9)	23.8 (2.3)	13.5 (1.3)	20.4 (0.8)	29.1 (2.0)
Abortion	15.9 (1.2)	14.8 (0.6)	28.6 (2.7)	16.3 (1.6)	16.2 (0.6)	25.4 (1.8)
Toxaemia/eclampsia	18.1 (1.3)	13.4 (0.6)	1.2 (0.1)	19.9 (1.9)	10.8 (0.4)	0.0 (0.0)
Postpartum sepsis	5.3 (0.4)	7.7 (0.3)	6.0 (0.6)	8.5 (0.8)	6.0 (0.2)	5.1 (0.4)
Obstructed labour	6.4 (0.5)	6.2 (0.3)	7.1 (0.7)	7.1 (0.7)	5.4 (0.2)	7.6 (0.5)
Other obstetric	11.7 (0.8)	16.8 (0.7)	9.4 (0.9)	14.2 (1.3)	13.7 (0.5)	13.9 (1.0)
Subtotal	72.3 (5.3)	79.0 (3.4)	76.1 (7.2)	79.5 (7.6)	72.5 (2.7)	81.1 (5.7)
Concomitant:						
Injuries, violence	17.0 (1.2)	7.2 (0.3)	4.8 (0.5)	12.8 (1.2)	8.4 (0.3)	3.8 (0.3)
Medical causes	6.4 (0.5)	7.6 (0.3)	15.5 (1.5)	4.9 (0.5)	12.6 (0.5)	8.8 (0.6)
Subtotal	27.7 (1.7)	21.0 (0.6)	23.9 (1.9)	20.5 (1.7)	27.5 (0.8)	18.9 (0.9)
Unspecified	4.3 (0.3)	6.2 (0.3)	3.6 (0.3)	2.8 (0.3)	6.5 (0.2)	6.3 (0.4)
All causes	100.0 (7.3)	100.0 (4.3)	100.0 (9.4)	100.0 (9.5)	100.0 (3.7)	100.0 (7.0)
Number of deaths	94	209	84	141	167	79
% of all maternal deaths	24.3	54.0	21.7	36.4	43.2	20.4

[a] Figures in parentheses are maternal mortality ratios, per 1000 live births.

observed for parity, although in this instance it was even more marked, with a very high proportion (29%) of fatal postpartum haemorrhages among women of parity ⩾6, and no deaths from eclampsia in this group. Of all maternal deaths, 54% occurred among women in the traditionally low-risk age group of 20–34 years, while 43% occurred among those in the traditionally low-risk parity group 1–5.

Timing of maternal death

Fig. 1 shows the distribution of maternal deaths by month of pregnancy and days postpartum. Abortion-related deaths are not included because they would have obscured the timing of death relative to the delivery. A total of 64 non-abortion-related deaths occurred during pregnancy (20% of all non-abortion-related deaths) and these were evenly distributed throughout the duration of pregnancy. During labour, but prior to delivery, 55 deaths (17%) occurred, while 83 (26%) were within 48 hours of delivery, 95 (30%) from 3 to 42 days after delivery, and only 20 (6%) from 43 to 90 days after termination of pregnancy. Had the more restricted WHO-recommended definition of maternal death been used, the last-mentioned 20 deaths would not have been included.

The distribution of the timing of maternal deaths for some selected causes is shown in Table 3. Findings that are of particular interest include:

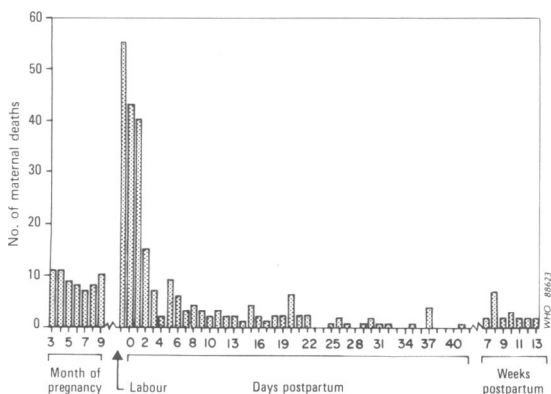—85% of deaths due to eclampsia occurred during labour or the first 48 hours following delivery;

Fig. 1. Distribution, by time, of maternal deaths (excluding abortion-related deaths) in Matlab, Bangladesh, 1976–85.

—68% of deaths due to postpartum haemorrhage occurred within 48 hours of delivery;
—54% of deaths due to sepsis occurred within 2 weeks of delivery;
—77% of fatal injuries and violent deaths occurred during pregnancy; and
—66% of deaths due to concomitant medical causes occurred within 6 weeks of delivery.

Table 3. Distribution of maternal deaths for selected obstetric and concomitant causes, by trimester of pregnancy and days postpartum, Matlab, Bangladesh, 1976–85

Cause	Trimester of pregnancy			During labour	Days postpartum				No. of deaths
	First	Second	Third		0–2	3–14	15–42	43–90	
Abortion[a]	23	36	11	—[b]	—	—	—	—	**70**
Toxaemia/ eclampsia	0	1	3	27	12	3	—	—	**46**
Obstructed labour	—	—	—	23	1	1	—	—	**25**
Postpartum haemorrhage	—	—	—	—	52	18	6	—	**76**
Postpartum sepsis	—	—	—	—	2	12	11	1	**26**
Injuries/violence	7	13	7	0	1	1	3	3	**35**
Concomitant medical causes	2	3	5	0	4	9	10	2	**35**

[a] The number of deaths for abortion refer to the month of pregnancy at the time of death, not to the timing of death relative to pregnancy outcome.
[b] — = not applicable.

DISCUSSION

The findings of the study confirm and extend those of previous investigations in rural Bangladesh over the last 20 years (3–6),[c] in which the major causes of maternal death were identified as postpartum haemorrhage, sepsis, eclampsia, and obstructed labour. As discussed below, our results raise a number of points relating to the methodology used, demographic correlates, and policy implications.

Methodology

The methods used to determine maternal deaths, together with their limitations, have been discussed elsewhere (7). In the present study, the number of deaths reported represent minimum estimates; the overall number of maternal deaths was underestimated, since maternal deaths that occurred during early pregnancy, e.g., early induced abortion, concealed pregnancies, and complications of ectopic pregnancy, were likely to be undetected as such. Interviewing the resident female CHWs in a given village was found to be the most efficient procedure for detecting such deaths. In this way, the 80 CHWs responsible for roughly 200 eligible women each were interviewed during regular meetings in subcentres. This procedure not only saved a considerable amount of time and travel costs compared to interviews of individual households (the method employed in the comparison area) but also yielded more accurate information because the CHWs had a better health knowledge of any complications associated with pregnancies and reported clearer descriptions than the lay villagers. However, this procedure could be used only in the MCH-FP area, and unreported cases were probably more frequent in the comparison area. At least 13 additional suspected maternal deaths were not included in the study for lack of sufficient information. Also, the assessment of specific cause of death was limited by recall bias (although maternal death represents a rare and important event in a village community) and by the lay reporting of the conditions and events that preceded death—these factors together being responsible for the inability to specify the cause of 5% of all maternal deaths. The potential confusion between primary and secondary cause of death might also have affected the classification of cause of death; for example, when a woman with an underlying chronic condition died from an acute illness or when multiple causes interacted and resulted in death.

The design of the study permitted also the calculation of maternal mortality in terms of the more re-

strictive WHO-recommended definition of maternal death. In this way, it was readily determined that 20 deaths occurred 43–90 days after termination of pregnancy but it was far more difficult, and impossible in many cases, to decide whether some causes were "incidental" or "accidental". If all deaths from injuries are discounted, 32 of the 35 deaths caused by injuries are excluded (three deaths occurred from 43 to 90 days after termination of pregnancy). By subtracting also these deaths, the total number of maternal deaths becomes 335, which is equivalent to a maternal mortality rate of 87 per 100 000 women of reproductive age and a ratio of 4.8 deaths per 1000 live births. Neither of these levels differs significantly from those obtained using the extended definition of maternal death. Given the difficulties of assessing the incidental or accidental nature of many causes of death, it is reasonable to retain the time limit of up to 42 days after termination of pregnancy, and to consider all deaths which occurred during this period.

Examination of the vital rates in the Matlab comparison area with those for the whole of Bangladesh suggests that this area may be representative of the country as a whole (12, 13). Therefore an extrapolation of the maternal mortality rates obtained in the Matlab comparison area would yield a conservative estimate of 26 000 maternal deaths per year for the whole country, assuming a total population of 104 million and a crude birth rate of 43 per 1000 (13).

Demographic correlates

As reported in a previous paper, maternal mortality ratios were higher among younger and older women than among 20–34-year olds; such ratios were also higher among nulliparous women and women of parity ⩾6 than among those of parity 1–5 (7). The results of this study indicate that the high maternal mortality ratios among teenagers and nulliparous women were mostly due to a higher proportion of eclampsia, as a direct obstetric cause, and also injuries and violence, as concomitant causes. The cause-specific mortality rate for injuries and violence was 15 per 100 000 women aged <20 years, compared with 7 per 100 000 women aged >20 years (relative risk, 2.1). This finding will be more fully investigated in a further report.

The high maternal mortality ratios among women aged ⩾35 years and those of parity ⩾6 were mostly due to postpartum haemorrhage, abortion, and concomitant medical causes. Older women, and especially those of high parity, were more likely to have severe anaemia, uterine atony, ruptured uterus, and retained placenta. Women aged 35–44 years, almost all of whom were married, had relatively easier access to traditional abortion services than their

---
[c] See footnote a, p. 643.

younger or unmarried counterparts. This finding is consistent with the results of previous studies in rural Bangladesh (4, 14, 15). The higher proportion of deaths due to concomitant medical causes among mothers aged $\geqslant 35$ years was more related to age than to parity and was mostly due to chronic digestive and chronic respiratory diseases.

These observations on age and parity indicate that the latter is a sharper determinant of direct obstetric causes of maternal death, whereas age is a sharper determinant of concomitant causes.

An analysis of the relative risks of specific socio-demographic characteristics, such as age, parity, the birth interval, and socioeconomic status, on maternal mortality, is currently being carried out.

Policy implications

The following findings from the study are relevant for health planners concerned with designing programmes for reducing maternal mortality in settings such as rural Bangladesh:

— over three-quarters of all maternal deaths were directly related to obstetric complications, all of which would have required attention from skilled health personnel;
— over 40% of all maternal deaths occurred during delivery or in the 48 hours following it. Prevention of most of these deaths would have required on-the-spot presence of highly trained personnel for the early detection of clinical signs and their management; and
— 80% of maternal deaths in the Matlab MCH-FP area occurred in village homes with no access to modern medical services, while 95% of all deliveries took place at home.

The strong family planning programme in the Matlab area was instrumental in reducing the number of pregnancies and therefore the overall risk of maternal death (7). Also, there was a shift in the distribution of childbirths from one high-risk group (older, high-parity women) towards another high-risk group (younger, nulliparous women). Family planning programmes can also contribute to the decrease in maternal mortality by improving maternal health and by reducing the number of unwanted pregnancies that might otherwise be terminated by induced abortion (16, 17). It is, nevertheless, important to recognize that the impact of a family planning programme upon maternal mortality will remain limited in the absence of other services, both preventive and curative.

Clearly, an expanded service that adds a strong maternity care component to the existing family planning programme should be designed and implemented. The resulting programme should have the following characteristics:

— be decentralized (covering a population of approximately 20 000) but strongly backed up by a local hospital and an effective chain of referral;
— be community based, but with professional midwives available at all times;
— be outreach-oriented, with emphasis on home visits for on-the-spot detection of potential complications of pregnancy and delivery; and
— be supported by simple technologies and appropriate guidelines for the management of any complications that should arise.

An essential component of such a programme is the availability of trained midwives at peripheral primary health centres. It would be the task of midwives to provide active antenatal care, attend as many home deliveries as possible, perform systematic postnatal visits, and treat or refer patients as soon as complications are detected. This is feasible on the national scale if:

— the national health system is committed to reducing maternal mortality in rural areas;
— midwives are given sufficient status and support; and
— local hospitals are sufficiently staffed and equipped for treating complicated cases (facilities for at least blood transfusion and caesarean section should be available).

Improved access to family planning and, if available, safe medical abortion are also key elements of an effective programme.

It is difficult to estimate the potential reduction in cause-specific maternal mortality that would be brought about by such a programme. However, an analysis carried out in 1987 before starting the maternity care project in Matlab (18) indicated that up to one half of maternal deaths could have been averted by proper use of antibiotics, treatment of pre-eclampsia, stoppage of haemorrhage, complete evacuation of the uterus, use of blood transfusions, timely referral for a caesarean section, and correction of nutritional and other medical disorders under the difficult field conditions prevailing. An evaluation of the programme that is currently being carried out should indicate whether this expectation is realistic. The programme should also result in a significant reduction in perinatal mortality.

ACKNOWLEDGEMENTS

RÉSUMÉ

CAUSES DE MORTALITÉ MATERNELLE EN MILIEU RURAL AU BANGLADESH, DE 1976 À 1985

Dans beaucoup de pays en développement, non seulement les plans de lutte contre la mortalité maternelle ont été relativement négligés, mais l'impact des programmes de santé maternelle, y compris en matière de planification familiale, est resté limité. On trouvera ici les résultats d'une étude rétrospective portant sur 387 cas de décès maternel survenus de 1976 à 1985 dans le district de Matlab, région rurale du Bangladesh située à 45 km au sud-est de Dacca.

L'étude, qui est axée sur les taux et les tendances de la mortalité maternelle et ses corrélats démographiques dans la région, présente une évaluation détaillée des causes de ce type de décès et analyse leurs implications en ce qui concerne les politiques de santé.

Pour obtenir des renseignements sur les grossesses et les causes de décès, on a eu recours aux méthodes ci-après: examen de données fournies par le réseau de surveillance démographique, qui suit depuis 1966 les 190 000 habitants de la région de Matlab; entretiens avec les agents féminins de santé communautaire qui ont dispensé des services de santé et de planification familiale aux femmes d'une moitié de la région à l'étude; entretiens à domicile avec les parents des femmes décédées dans l'autre moitié de la région (région de comparaison).

Sur un total de 1037 décès de femmes âgées de 15 à 44 ans, 387 (37%) ont été classés comme décès maternels, c'est-à-dire qu'il s'agissait de décès, quelle qu'en soit la cause, survenus pendant la grossesse ou dans les 90 jours suivant la fin de celle-ci. Les victimes étaient des femmes non mariées dans 8% des cas, des femmes de moins de 20 ans dans 24% des cas et des nullipares dans 36% des cas. Le taux global de mortalité par cause déterminée était de 101 pour 100 000 chez les femmes âgées de 15 à 44 ans, tandis que le taux de mortalité maternelle était de 5,5 pour 1000 naissances vivantes. La cause de 77% de l'ensemble des décès maternels était directement liée à l'accouchement, 20% étant dus à une hémorragie de la délivrance, 18% à un avortement, 12% à une éclampsie, 7% à une septicémie

du post-partum et 6,5% à une complication empêchant la délivrance. D'autre part, 18% des décès maternels ont été attribués à des causes concomitantes (dans la moitié des cas, il s'agissait de causes médicales, et dans l'autre moitié de blessures ou d'actes de violence). Enfin, pour 5% de ces décès, la cause n'a pas été précisée. Les décès dus à une hémorragie au moment de la délivrance présentaient une corrélation positive à la fois avec l'âge de la mère et avec la parité, tandis que les décès dus à l'éclampsie et aux blessures étaient plus fréquents chez les femmes jeunes ou ayant eu peu d'enfants; quant aux décès résultant d'un avortement, ils étaient plus nombreux chez les femmes d'un certain âge ou multipares. Si l'on ne tient pas compte des décès par avortement, 20% de tous les décès maternels se sont produits pendant la grossesse, 44% pendant le travail et au cours des deux jours suivant la délivrance, et 36% pendant le reste de la période de post-partum.

L'article examine les difficultés méthodologiques rencontrées lors de l'évaluation des causes de décès maternel, notamment en ce qui concerne les décès liés au début de la grossesse et à l'avortement provoqué. Il compare également les taux de mortalité maternelle obtenus en utilisant la définition relativement large adoptée dans cette étude et la définition plus restrictive recommandée par l'OMS, qui considère les femmes décédées dans les 42 jours suivant la délivrance.

Les résultats de l'étude confirment la nécessité d'élaborer une stratégie destinée à combattre les risques de la grossesse et de l'accouchement dans des environnements analogues à celui du Bangladesh rural, où presque toutes les naissances ont lieu à domicile. Cette stratégie doit être fondée non seulement sur la prévention et l'éducation, y compris la planification familiale et les soins anténatals, mais aussi sur la présence systématique, auprès des femmes qui accouchent à domicile, de sages-femmes professionnelles ayant reçu une formation adéquate et pouvant compter sur un système efficace d'orientation-recours.

REFERENCES

1. MAHLER, H. The safe motherhood initiative: a call to action. *Lancet*, **1**: 668–670 (1987).
2. CHARLES, L. Report to the Directorate of Health Services in East Pakistan. Vital Statistics, Government of East Pakistan. Asian Medical Systems. University of California Press, 1958.
3. CHEN, L. C. ET AL. Maternal mortality in rural Bangladesh. *Studies in family planning*, **5**: 334–341 (1974).
4. ROCHAT, R. W. ET AL. Maternal and abortion-related deaths in Bangladesh 1978–1979. *International journal of gynaecology and obstetrics*, **19**: 155–164 (1981).
5. KHAN, R. ET AL. Maternal mortality in rural Bangladesh: the Jamalpur district. *Studies in family planning*, **17**: 7–12 (1986).
6. ALAUDDIN, M. Maternal mortality in rural Bangladesh: the Tangail district. *Studies in family planning*, **17**: 13–21 (1986).
7. KOENIG, M. A. ET AL. Maternal mortality in Matlab, Bangladesh, 1976–85. *Studies in family planning*, **19**: 69–80 (1988).
8. COMMITTEE ON MATERNAL AND CHILD CARE OF THE COUNCIL ON MEDICAL SERVICES. *A guide for maternal death studies*. Chicago, American Medical Association, 1964.
9. WORLD HEALTH ORGANIZATION. *International classification of diseases, injuries and causes of death*. IXth Revision. Geneva, WHO, 1977.
10. BHATIA, S. ET AL. The Matlab family planning and health services project. *Studies in family planning*,
11: 202–212 (1980).
11. PHILLIPS, J. F. Integrating health services into an MCH-FP program—lessons from Matlab, Bangladesh. *Studies in family planning*, **15**: 153–161 (1984).
12. SHAIKH, K. ET AL. *Demographic surveillance system Matlab. Vol. 15. Vital events and migration 1984*. Dhaka, International Centre for Diarrhoeal Disease Research, Bangladesh (In press).
13. *Demographic indicators 1986*. Bangkok, Population Division, Economic and Social Commission for Asia and the Pacific, 1986.
14. KHAN, A. R. ET AL. Induced abortion in a rural area of Bangladesh. *Studies in family planning*, **17**: 95–99 (1986).
15. ROCHAT, R. W. ET AL. Induced abortion and health problems in developing countries. *Lancet*, **2**: 484 (1980).
16. TRUSSELL, J. & PEBLEY, A. R. The potential impact of changes in fertility on infant, child and maternal mortality. *Studies in family planning*, **15**: 267–280 (1984).
17. FORTNEY, J. A. The importance of family planning in reducing maternal mortality. *Studies in family planning*, **18**: 109–114 (1987).
18. FAUVEAU, V. & CHAKRABORTY, J. Maternity care in Matlab: present status and possible interventions. Dhaka, International Centre for Diarrhoeal Disease Research, Bangladesh, 1988 (ICDDR,B Special Publication No. 26), pp. 20–21.